

CONSTRUCTION SPECIAL SPECIFICATION**SECTION 13995_S****SPECIAL CONSTRUCTION SYSTEMS COMMISSIONING**

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SPECIAL SPECIFICATION**SECTION 13995S****SPECIAL CONSTRUCTION SYSTEMS COMMISSIONING****PART 1 - GENERAL****1.01 RELATED WORK SPECIFIED ELSEWHERE**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 01810S – Facility Commissioning Requirements
- C. Section 15995S – Mechanical Systems Commissioning
- D. Section 16995S – Electrical Systems Commissioning

1.02 BUILDING SYSTEMS & COMPONENTS TO BE COMMISSIONED

- A. The following systems, equipment and their components are included in the scope of the commissioning activities and are considered to be commissioned systems and equipment.
 - 1. Section 13100 – Lightning Protection
 - a. Confirm installation per contract requirements.
 - 2. Section 13852 – Intelligent Fire Alarm System
 - a. Confirm installation per contract documents.
 - b. Test individual alarm and notification devices.
 - c. Verify proper battery capacity.
 - d. Confirm notification of remote monitoring station.
 - 3. Section 13943 – Facilities Control Systems
 - a. Confirm installation per contract requirements.
 - b. Verify point-to-point communication to sensors and control devices.
 - c. Verify calibration of sensors.
 - d. Verify proper operation of control devices.
 - e. Verify all sequences of operation.
 - f. Verify all alarm notifications.

- g. Verify all graphics are accurate and meet SNL standards.

1.03 RESPONSIBILITIES

- A. The Contractor shall be responsible for scheduling, supervising and performing start-up, testing and commissioning activities specified in this section and necessary to demonstrate to SNL successful operation of the commissioned systems.
- B. The Contractor shall review submittal data for conformance with requirements, shall authorize the initial starting of equipment and systems in a manner to avoid damage during construction, shall oversee start-up and testing, and shall document that the operational requirements of each system have been accomplished.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

- A. The Contractor shall provide the necessary equipment to fully test the commissioned systems as defined in the functional performance test procedures provided by the CxA.
- B. Instrumentation shall meet the following standards:
 - 1. Be of sufficient quality and accuracy to test and measure system performance within the tolerances required to determine adequate performance.
 - 2. Be calibrated on the manufacturers' recommended intervals with calibration tags permanently affixed to the instrument being used.
 - 3. Be maintained in good repair and operating condition throughout the duration of use on this project.
 - 4. Be re-calibrated/repared if dropped or damaged in any way since last calibrated.

2.02 MEAN OF ACCESS

- A. The Contractor shall provide means for the CxA and Owner Representatives to access, observe and visually confirm proper operation of all equipment and systems. These means shall be in compliance with all OSHA and job-site safety regulations.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall attend commissioning meetings as required by the Prime Contractor.
- B. The Contractor shall report in writing to the CCL concerning the status of activities as they affect the commissioning process and the status of deficiencies found during site visits or the performance of functional testing.
- C. The Contractor shall provide the CxA with data sheets and submittals for equipment to be commissioned.
- D. The Contractor shall prepare a preliminary schedule for commissioning activities.
- E. The Contractor shall notify the CxA when commissioning activities not yet performed or scheduled will delay construction.

3.02 START-UP PLAN

- A. The Contractor shall perform start-up testing for each piece of equipment to ensure that the equipment and systems are properly installed and ready for operation, so that functional performance testing may proceed without delays.
- B. The Contractor shall prepare a start-up plan for each piece of equipment. This plan shall be submitted to the CxA for review and comment. The start-up plan shall consist, at a minimum of the manufacturer's standard start-up and check out procedures copied from the installation manuals.
- C. Four (4) weeks prior to expected start-up for a piece of equipment, the Contractor shall notify SNL in writing. The execution the start-up plan shall be directed and performed by the Contractor. The CxA and/or SNL may be present for the start-up of the equipment.
- D. The Contractor shall submit the completed checklists and startup reports to the CxA for review. The Contractor shall note all non-compliance items on these checklists. The Contractor shall notify the CxA when outstanding items have been corrected.
- E. The Contractor shall complete the start-up plan and resolve or correct all issues resolved before functional testing may begin.

3.03 FUNCTIONAL PERFORMANCE TESTS

- A. The Contractor shall provide all documentation as requested to the CxA for development of functional performance testing procedures. This documentation shall include, at a minimum, manufacturer installation, start-up, operation and

maintenance procedures. The CxA may request further documentation as necessary for the development of functional performance tests.

- B. The Contractor shall review the functional performance test procedures developed by the CxA.
 - 1. The Contractor shall respond in writing to the CxA regarding the acceptability of the proposed test procedures.
 - 2. The Contractor shall note any necessary modifications to the procedures due to the actual equipment/systems or safety concerns and shall submit these to the CxA for consideration.
- C. The Contractor shall place equipment and systems into operation and continue the operation as required during each working day of the testing activities.
- D. The Contractor shall accomplish the functional performance testing of equipment based on procedures developed by the CxA and as reviewed by the Contractor.
 - 1. The Contractor shall provide skilled technicians to operate the systems during functional performance testing.
 - 2. The Contractor shall correct any deficiencies identified during testing and retest equipment as required.
- E. Functional performance testing is intended to begin upon completion of a system. Functional testing may proceed prior to the completion of the system upon mutual agreement between the Contractor, SNL and the CxA.
- F. Functional testing shall verify all sequences of operation defined in the Contract Documents for the commissioned equipment and systems.
 - 1. Testing shall occur by overriding setpoints or sensor readings at the FCS or by other means mutually agreed to by the Contractor, the CxA and SNL to initiate sequences of operation and verifying the response of the system.
 - 2. Sequences of operation shall be verified under normal power, emergency power, and fire alarm scenarios.
- G. Upon successful completion of all functional performance tests, the Contractor(s) shall perform Integrated Systems Testing. The testing shall document and verify the proper response of all Division 13 systems to all potential utility and emergency power operating and failure scenarios.

3.04 FACILITY CONTROL SYSTEM TRENDING

- A. The Contractor shall provide a minimum of four (4) weeks of trend data on all monitored control points following successful completion of the functional performance tests pertaining to the control systems.
- B. The Contractor shall provide the trend data in the following formats:
 - 1. Electronic files suitable for importing into Microsoft Excel
 - 2. Electronic Adobe Acrobat files
- C. The Contractor shall make any adjustments to the control tuning constants deemed appropriate by the CxA to achieve the Operational Performance Requirements of the control system.

3.05 DEFERRED FUNCTIONAL PERFORMANCE TESTING

- A. The Contractor shall perform any deferred testing as required to properly demonstrate successful operation to the SNL CM.
 - 1. Some test conditions may not be able to be simulated and thus require these actual conditions to be present to implement the test.
 - 2. A mutually convenient time to SNL, CxA and Contractor will be scheduled when these test conditions will be present to conduct this deferred testing.
- B. The Contractor shall perform these tests as indicated in the functional performance test procedures.
- C. The Contractor shall correct any deficiencies or failures identified in the process of performing these tests.

END OF SECTION